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Telephony

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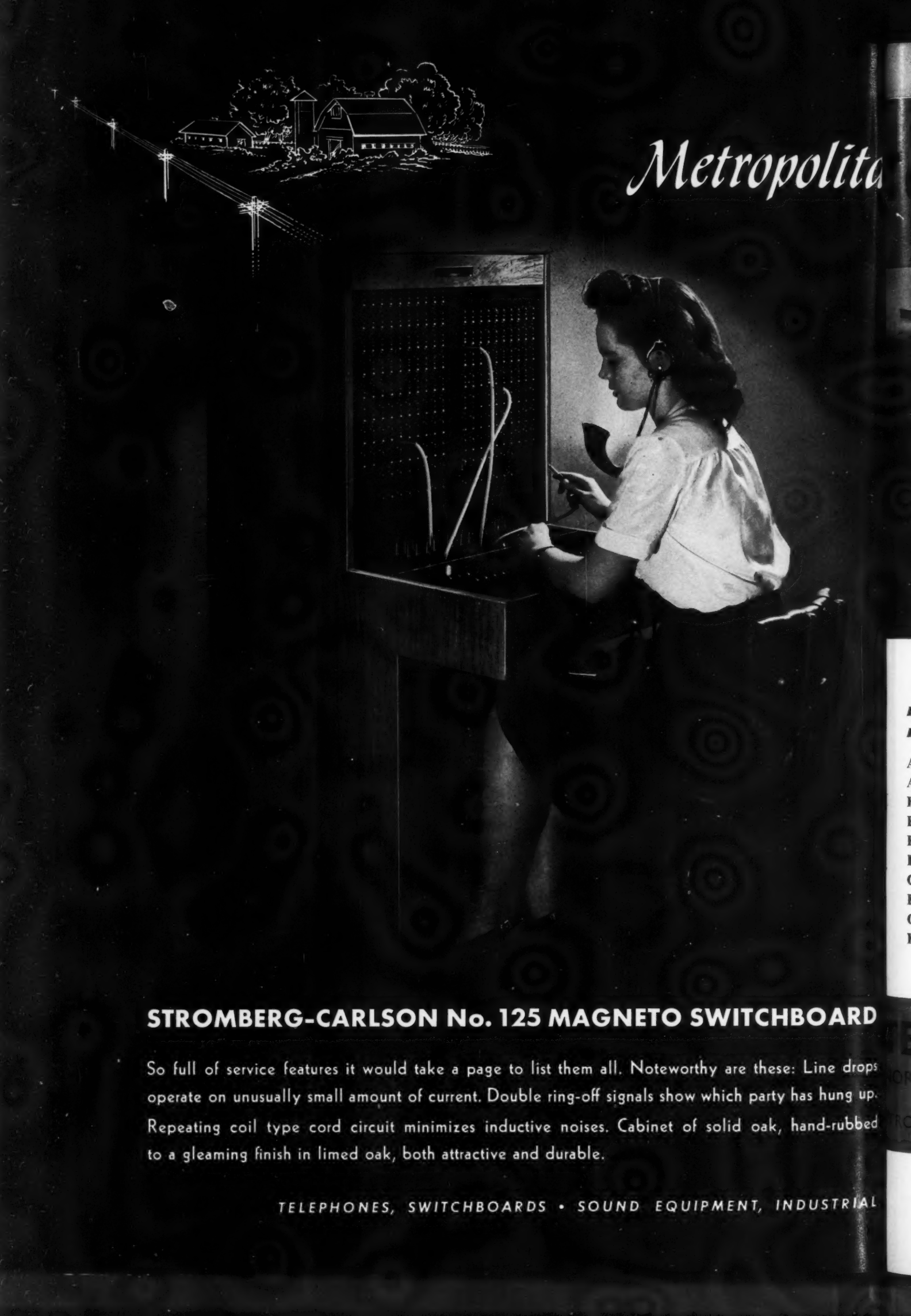

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FLASHES AND PLUGS

IT'S A HARD LIFE. Recently a 16-year-old wrote a letter of complaint to the president of his local telephone company saying that the lack of a telephone in his house hampered his social life. He said, "The girls cannot reach me by telephone and they are also complaining." The president wrote him a nice letter and added: "P.S. When I was 16 I didn't have a telephone either."

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INSECT INTERFERENCE. An overturned truck, 157 hives of bees, and a felled utility pole disrupted telephone service north of Chico, Calif., for a day recently. Angry insects were dumped along the highway by the overturned truck, causing traffic to be detoured until chemicals and water could restore quiet. Telephone men were unable to venture into the multiple beehive until late afternoon to repair the broken cable.

Nearly all the bees swarmed into a nearby tree. Although the owner salvaged most of them after sundown, he said he suffered a 75 to 80 per cent loss.

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MANHUNTING "DOWN UNDER." Australia's nation-wide radio network has proved so successful that the police chiefs are now considering an extension of the present set-up to enable them to have direct radio-telephone communication with Scotland Yard and other important world police centers. Radio facilities have enabled the authorities to keep informed of a criminal's activities faster than he can move.

While police officers experimented in the radio field, the owners of Broken Hill Proprietary, Australia's largest industrial organization, have announced that it will open the first radio-telephone service to be installed along water pipelines in three of its outlying stations. The use of this device, obviating the necessity of laying hundreds of miles of telephone cables, is expected to extend eventually to Australia's vast hinterland.

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THOSE THINGS WILL HAPPEN. And then there was the unlucky fellow who ran his car off the road, crashed through three posts, plunged down an embankment, and escaped injury! When he went to telephone for help, however, he fell into a newly dug cellar and broke his arm.

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NO TIME TO SPARE. An attitude of marked impatience with persons who exhibit bad telephone manners is held by H. L. Mencken, the plain-speaking author and authority on American language, who always answers his own telephone.

He has a particular aversion to people who have their own secretaries put in a call and then only pick up the telephone themselves after the person they want to talk to has been made to wait on the line.

When Mr. Mencken receives a call and hears an operator or secretary say, "Mr. Mencken? Just a moment please, Mr. Joe Blow is calling," he just hangs up.

• • •

TEMPER, TEMPER. The Post Office, operator of the British telephone system, has started a "Don't lose your telephone temper" campaign. Too many telephone instruments have been damaged recently by users who slam receivers down.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

October 2, 1948

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ABC of the Telephone

By FRANK E. LEE

AS discussed in recent installments of this series, relay circuit fault locating procedures should be based upon knowledge of the following factors:

(1) Purpose of the relay circuit.
(2) Analysis of circuit schematic drawings.
(3) Function of individual relays.
(4) Sequence of relay operations.

Once these various factors of relay circuit operations have been studied and understood thoroughly, the telephone repairman is in a position to concentrate on the actual fault locating procedure. Definite procedure should be developed and notes prepared in order that the repairman can locate faults in the shortest possible time. Sequence drawings of the ball and chain type described in the preceding article can be prepared for any circuit used in the exchange area. The use of these drawings enables the repairman to determine what circuit action is functioning satisfactorily; where the operating sequence is broken; and the relay or relays that should operate next.

Experience has proved that careful preparation of this nature will save time in fault locating. Another important result—more cases of trouble will be cleared through the use of correct methods, as compared with cases lost because of hit or miss methods.

Variable Trouble Factors

While speaking of experiences in telephone relay circuit fault locating procedures, there are certain variable factors which may cause trouble in circuit operation.

All relays designed for telephone circuits have operating characteristics that fall within certain definite limits. Generally speaking, the resistance of the winding itself is the controlling factor as to the amount of current that will flow in the operating circuit of a particular relay. The amount of current flowing through a relay winding determines the magnetic flux or pull that the core exerts upon the movable armature. The strength of this magnetic flux must be within a certain range to enable the following conditions to be met:

(1) Armature must overcome any contact or balancing spring tension drag, and pull up in a specified time interval. Fast operating relays may pull up in less than 10 milliseconds. Slow acting types may range between 20 milliseconds and more than one minute to operate.

(2) Relay core should not become saturated by an intense magnetic flux because the relay must release immediately after the operating or holding currents are released. Release characteristics can be controlled with slow release relays as needs of the circuit require.

PART XXXVI. Fault locating—Relay circuits. The preceding article in this series appeared in the August 14 issue, page 17.

Number of Contacts Important

Another factor which is considered in relay design is the number of contacts that the relay must open or close, or both, in combination. However, whether the relay must close a single set of contacts, or a large number of contacts, the strength of the core and gap of the armature are designed accordingly.

Because of the foregoing factors, each relay has certain variable operating characteristics as follows:

(1) Battery potential.
(2) Armature air gap.
(3) Tension of contact springs holding armature in released position.

These factors are termed variable because any one or all three may change while the relay is in service.

Drop in Battery Potential

Most batteries are equipped with controls which maintain the charge within certain high and low limits. In the case of PBX switchboards equipped with wet cell batteries, the charging rate is engineered over a 24-hour a day period. The charging rate can be controlled to meet the normal use requirements of the PBX subscriber. Usually, for small installations, the charging rate is controlled by a manually adjusted rheostat placed in the charging lead. Larger installations may warrant the installation of automatic voltage regulator equipment.

When a relay circuit is reported in trouble on a PBX switchboard equipped with an automatically controlled battery plant, the repairman should make sure that the battery control circuit is functioning properly. If the battery voltage is at, or lower than, its minimum limits, certain critical relays may not operate properly. Obviously, the proper maintenance procedure is to correct the battery charge condition instead of attempting relay adjustments for the circuit in trouble.

If the PBX switchboard battery charging rate is controlled by a fixed resistance, a low battery condition generally can be corrected by removing all resistance from the charging lead. Usually, the repairman can pick up an indication of any abnormal usage during the original discussion of the trouble. The repairman should ascertain from the operator if the trouble

occurred in only one circuit or if it has been noticed in all similar circuits.

Preventive maintenance routines should be established in order that all PBX battery plants will be visited at least once a month. Liquid level of all battery cells should be checked to be sure the electrolyte covers the plates by at least a half inch. Check the specific gravity reading of each cell. A cell in good condition should have a reading of slightly over 1200. Also see that the battery terminals are clean and that there are no signs of corrosion.

Normal water loss of the average PBX battery cell is one-fourth of an inch per month. A fairly accurate check of battery charging and discharging conditions can be obtained by gauging the amount of water loss between maintenance visits. Water loss is caused by normal evaporation plus excessive gassing, which may be the result of excessive charging or discharging.

As an example of how the water loss method of PBX battery maintenance works, if the water loss is excessive and the specific gravity is normal, the batteries are being charged excessively. If the loss is excessive and the specific gravity is below 1,180, the discharge rate is excessive.

Battery maintenance will be the subject of a forthcoming installment of this series, at which time further details will be presented on the water loss method of battery maintenance.

If the over-all condition of the PBX battery plant is good, assume the charging rate and all other factors is correct. However, if low batteries are indicated, determine the reason and make adjustments accordingly. If fault conditions as outlined above are located, usually the battery plant will operate satisfactorily after the repairs are made. At other installations, the cause of low battery conditions may be traced to the installation of additional equipment with subsequent increased usage and greater battery drain. Where these conditions are found, corrective maintenance would mean increasing the charging rate.

Armature Air Gap Out of Adjustment

A variation of five or six-thousandths of an inch in a relay armature air gap may not be discernable to the naked eye. However, a five-thousandths of an inch greater air gap may be the reason why a relay will not operate, or will fail at certain times during the day. Generally, the setting of the armature air gap is controlled by an adjusting screw or nut. Once in a while these screws and nuts become loose during periods of continual operation, thus throwing the relay out of adjustment.

The manufacturers have established definite adjustment and operating requirements for all relays. When in doubt, check the relay against the established requirements and make adjustments accordingly. All repairmen who have occasion to work with relays should be equipped with thickness gauges to use in obtaining the correct armature air gap setting.

Contact Spring Tension

Manufacturers' relay circuit requirement tables indicate tension in grams for each contact spring. This figure means that a certain amount of force is required to move the spring either away from the armature or away from its mate contact spring. The tension of the contact springs can be changed with the use of spring bending tools. The use of these special tools or of flat nose relay pliers is recommended for all contact spring adjustment operations. Use of these tools, plus a gram gauge, makes possible accurate adjustments of relay contact springs.

Failure of Relay to Release

Up to this point, all of the discussion has been based on locating reasons why relays fail to operate. However, in many instances, circuit trouble is caused when certain relays fail to release. There are several reasons why a relay may fail to release, as follows:

(1) Insufficient contact spring tension.
(2) Magnetic saturation of core.
(3) Mechanical fault.

Insufficient contact spring tension may cause release failures in the same manner as excessive tension caused the operating failures previously described. In many instances, only a few grams tension will mark the difference between a successful release and a release failure. Generally, the repairman can use a gram gauge against the armature and determine if insufficient spring tension is causing the release failure. If the relay releases readily with the application of four or five-gram tension against the armature, an accurate adjustment, according to the circuit requirement specifications, should solve the problem. However, if the armature appears reluctant to move away from the core with as high as 10 grams extra back tension, check for saturation of the core.

Magnetic saturation of a relay core is possible with practically any relay after many years of use. In fact, most any relay core retains a portion of its magnetism even after limited use. However, other mechanical characteristics of the relay are designed to compensate for this condition. Trouble occurs when this residual magnetism builds up to a point where the armature is held operated even after the operating and holding circuits are opened.

Another type of trouble which appears very similar to that caused by magnetic saturation of the relay core, is the sticking armature. During rather humid weather a mild chemical action may take place between the armature and the relay core. The result of this chemical action is not readily discernible on the armature or core. However, the deposit left causes the armature to stick to the core with sufficient adhesion to hold the armature in an operated position.

To determine if either of the above conditions is causing the armature to be held operated, insert a piece of clean bond paper between the armature and core and observe the operation of the relay. If the armature operates and releases satisfactorily with the paper between them, either the area of the core or the armature itself should be papered where they come together.

Papering of a relay can be accomplished by placing a layer of adhesive backed paper around the core or armature. Paper of this type is furnished in dispenser type holders where it will remain in good condition until needed. Many chronic cases of sticking relays can be forgotten after the paper has been applied.

Some circuits are equipped with slow-release supervisory relays. These relays are sluggish or release to prevent false disconnects if the subscriber station switch-hook should be jiggled momentarily during the progress of the call. Metallic magnetic separators may be provided for installation on these relays when the armatures tend to stick. The magnetic separator serves the same purpose as the papering process previously described.

Mechanical faults of relays, which may cause the armature to stick, generally result from long periods of use. In this type of trouble, a mechanical condition tends to cause the armature to lock or bind, thus impairing its free movement and operation. The pivot pins may wear slightly, causing a tendency to bind. Corrective procedure would involve replacement of the armature, or of the complete relay as required.

Another type of mechanical fault may occur on relays equipped with armature stop pins. Usually these pins are installed in the face of the arma-

ture to prevent the armature and core from coming in direct contact. As a result, the magnetic circuit is held open and the armature will release with less back tension on the contact springs. If the hardness of the relay core is a little below standard, these hard stop pins may actually drive indentations into the core. If these indentations become deep enough, the stop pin may become locked in one of the holes of the core and thus hold the armature in operated position. Temporary repairs can be made by installing a magnetic separator on the relay core. However, for permanent repairs, replacement of the relay is required.

Locked Contacts Caused by Contact Build-Up

Whenever a relay contact opens a circuit in which there is an impedance such as a relay operating winding, a tendency for arcing between the contacts exists. Arcing of this nature tends to destroy the contact surfaces. As a general rule, the direction of current flow through the contacts is in one direction only. For this reason, the arcing condition tends to remove contact metal from one contact and at the same time form a deposit or build-up on the mate contact. When this condition reaches its advanced stages, the jagged surfaces of the contacts become locked together. As a result, the relay bearing the contacts may be held operated. In any event, the functional circuit will be held closed, thus causing a circuit failure.

To repair this fault, the build-up must be removed from the one contact and the rough edges of the pitted contact must be burnished. The safest method of removing a build-up from a contact is to use a gauging file which limits the amount of metal removed. A flat jeweler's or contact file can be used if care is exercised to prevent excessive removal of contact metal. The pitted contact can be dressed with a round pointed burnishing blade.

Excessivley pitted or worn contacts can be repaired by welding a new contact on the springs. Special tools are available for this purpose, which permit these repairs to be made without removing the relays from the mounting plates.

Permanent repairs for pitted contacts are made by reducing or eliminating the arcing conditions that cause this type of trouble. Arcing at breaking contacts can be eliminated or suppressed to a point where no trouble will be caused, through the use of contact protection networks. As described in a previous article of this series, contact protection networks usually consist of a resistance and condenser in series wired across the two contacts to be protected. If excessive arcing exists across contacts for which contact protection has been provided, usually the protection network will be found open.

Dirty Contacts

The purpose of any relay contact is to close an electrical circuit. This function will not be performed if for any reason the metal portions of the two mating contacts fail to touch each other. If there is a layer of dirt covering the surface of the contacts, the electrical continuity will be open and the contacts will not perform their required function. The surprising fact is the small amount of dirt that will cause a dirty contact. A small speck of dirt, a piece of lint, or a flying particle of acetate insulation removed from a piece of wire, if lodged between a pair of contacts, will cause as much trouble as would a thick layer of dirt.

The first step in clearing this type of trouble is to test the contact to be sure a dirty contact exists. These tests can be made with an ordinary test receiver, using battery or ground as the particular circuit would require. If the fact is established that a dirty contact exists, do these things:

(1) Brush the contacts from the bottom to the top, using a clean small artist's sable hair brush.

(2) Burnish the contacts with a clean flat contact burnishing blade.

(3) Again brush the contact upward with the clean brush.

The upward brushing motion is recommended because of the fact that dirt tends to settle on top of the contact springs. If the brushing motion is downward, more dirt will be brushed into the contacts, while an upward motion will clean the contact without carrying more dirt through the contacting areas. The second brushing operation is recommended to remove any particles that may have been dislodged by the burnishing blade.

Contact Follow

Practically all relay contacts are designed to have a small amount of "follow" as they close. This "follow" means the movable spring will touch, then move, the stationary spring a short distance before the armature comes to rest against the core. When this condition exists, the movable spring is said to have follow against the stationary spring. Generally, the amount of follow closely approximates five-thousandths of an inch.

Adequate contact follow is a desirable characteristic in relay operation. The following action develops a wiping motion as the two springs come together. The result is the contacts tend to clean themselves with each operation. After a certain period of operation, the tension or adjustment of both springs may decrease to a point where there is little, if any, follow as the contacts close. Without this follow, a film will collect on the contact surfaces, and thus a case of trouble develops.

During the process of clearing dirty contact trouble, the repairman should check all the contacts on the relay for follow. Follow can be checked as follows:

(1) Gauge by eye as the relay is operated manually.

(2) Operate the relay electrically and use a tooth pick to move the stationary spring away from the movable spring. The follow of the movable spring should be perceptible.

(3) Use thickness gauges according to the manufacturer's instructions covering adjustment of the particular relay.

Contact Bounce or Chatter

When relay contact springs are adjusted with too light a tension, the contacts may make and break a few times for a short interval after the armature has come to rest against the core. This condition is known as contact bounce, or chatter. In certain dial pulsing or recording circuits, such a condition could result in wrong numbers received by the subscriber. In other circuits, the result could be detected as a static condition.

Contact bounce or chatter is an indication of unreliable contact closure. High speed motion pictures have shown that contact bounce occurs to some extent in the closure of practically any relay contact. However, the amount or degree of bounce can be controlled by proper contact adjustment. Therefore, good maintenance practice indicates that the repairman should follow accepted maintenance procedures while making contact spring adjustments.

Open Non-Inductive Winding

As a general rule, supervisory relays installed directly in talking circuits are equipped with non-inductive windings. The non-inductive winding reduces transmission loss of the circuit. Occasional reports of poor transmission will be received. Subsequent investigations and tests may reveal the non-inductive winding is open. Generally, in these instances, replacement of the relay will be required to clear the trouble.

Open Auxiliary Windings

A number of special purpose relays are designed with secondary or tertiary

(Please turn to page 38)

IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH
WASHINGTON EDITOR

AT&T license contract fee to Bell associated companies reduced. . . . Bell official discusses effect of inflation on telephone company earnings. . . . House committee report on FCC unfair, Mr. Welch thinks.

THE announcement last week in Chicago that the AT&T will reduce the percentage payment for service performed under license contracts to Bell System companies from 1½ per cent to 1 per cent of gross revenues represents a significant change in Bell System intercompany practices. The announcement was made by Chairman McWhorter of the Special Telephone Committee of the National Association of Railroad & Utilities Commissioners (NARUC) (TELEPHONY, Sept. 25. p. 68).

This committee has been working on these charges for intercompany payments in the Bell System for the past two years. And it will continue to study the subject, according to Commissioner McWhorter, which indicates that a final report from the committee to the NARUC may not necessarily agree to the compromise by which the Bell System payments have been reduced by the percentage - of - revenue basis retained. We will know more about that shortly after the election when the NARUC holds its annual convention in Savannah, Ga., Nov. 15 to 18.

Of course, neither Bell officials nor NARUC spokesmen have used the word "compromise" in view of the uncertainty as to whether a final agreement has been reached. But if it develops that such an agreement, or at least an understanding as to the Bell System's national policy of license payments has been reached, it would in effect amount to a compromise.

The NARUC committee was reliably reported to be in favor of recommending that payments by system companies for services performed by the AT&T should be on an actual cost basis or some similar arrangement whereby the payments would definitely be related to the amount of services actually performed. But because of the national scope of the AT&T relationship to various system companies and the fact that some of the admitted benefits under the Bell license contract are intangible (such as the contribution to the support of Bell Laboratories which may return more research benefits one year than in another year), the AT&T obviously feels the need for retaining a generalized basis for obtaining a steady and predictable income in return for services available to all system companies. In a way, it is something like premium payments on fire insurance. It would obviously be absurd to object to the payment of such fire insurance because no fire occurred during a particular year.

Furthermore, changing over the Bell System payments to a billing and cost basis for services actually performed by the AT&T would involve considerable overhauling and rearrangement of Bell System relations, including the scrapping of the license contracts. The reduction in the percentage of revenue will mean a saving of approximately $11,000,000 a year for the Bell operating companies.

The NARUC - Bell understanding does not necessarily end individual state action. The California commission, for example, already has scheduled a "show cause" proceeding in that state designed to put the Pacific Telephone & Telegraph Co. on an actual cost basis with relation to its payment for services under its license contract with the AT&T. It is understood that the California commission intends to go ahead with its proceeding, and there may be some other state commissions which will elect to follow a similar course.

Most of the state commissions, however, are likely to be satisfied with the arrangement worked out by the NARUC committee. This is because it will have the effect of retaining substantial funds by the operating companies over which the state commissions have rate jurisdiction. Since these funds will be available to offset other operating expenses of the system companies, the pressure for rate increases will be, to that extent, somewhat lessened. In the final analysis, the amount available for dividends on system company stock finds its way to the parent company anyhow—through the latter's ownership of system company shares. It is believed that the AT&T will resist in court any further attempt by individual state commissions to interfere with the license contract obligations in the form of attacks on the percentage basis for computing payments for parent company services.

• • •

Speaking of Bell System rate practices, it brings to this reporter's mind two excellent discussions by two distinguished Bell System lawyers at the recent meeting of the Public Utilities Section of the American Bar Association in Seattle. One of these was a paper by AT&T's general attorney, T. Brooke Price, and the other was a statement by Tracy J. Peycke, vice president and general counsel for the Northwestern Bell Telephone Co.

Mr. Price's remarks were more general—being in the nature of a review of court and commission decisions during the past year affecting the telephone industry—including the telephone recording case and the telegraph office substitution case, both handed down by the Federal Communications Commission (FCC). Mr. Price also discussed recent labor regulation, especially that affecting public utilities, such as the compulsory arbitration statute now being litigated in some of the states.

Mr. Peycke's address, on the other hand, devoted considerable attention to the pressure which the postwar inflationary period, through which we are passing, has placed on telephone company earnings. Probably the reason why this writer found so much of in-

terest in Mr. Peycke's address was the fact that the latter's views, by coincidence, seemed to follow a pattern of contention very similar to discussions on telephone rate regulatory problems which have appeared in this department.

In a word, the Northwestern Bell official seems to feel that the inflationary period has created a new situation demanding an open mind and a fresh approach to such questions as valuation, rate of return, and depreciation which some regulatory authorities like to insist are closed matters no longer open for discussion.

After comparing the inflationary period which followed World War I and the need for prompt regulatory relief during that period, Mr. Peycke insisted that the need for prompt rate increases for telephone companies is just as great today. He stated:

"Temporary and emergency orders relate to the problem created by the time which the regulatory process takes. Rising cost levels create the problem also of the inadequacy of current and past results to measure future requirements. Everyone agrees, of course, that rates are made for the future. Under stable conditions the future can be measured reliably by the recent past. Under current conditions this is not true. I am not referring to further increases in cost levels which may occur. A little authentic gift of prophecy might be useful but in its absence it would seem best to stay with known facts. What is referred to is an entirely different matter.

"The respect in which current results are known to be an inadequate measure of the future is this matter of the increasing unit cost of the plant. Expansion is being accomplished at these present high prices. As plant is replaced in ordinary course, the new property also goes in at present prices. Depreciation has been accrued only on the old basis. There is need for a return on rapidly growing dollars of investment which have gone into new property and which generally is not capable of producing any greater return than the old. Moreover, earnings have been kept at whatever levels are current by a very considerable overcrowding of facilities. As this condition is relieved, there is an increase in investment without any corresponding increase in revenues. These processes can be forecast over a period of say a couple of years fairly reliably. This involves making no assumptions that costs and prices will increase further in this period. In this way it may of course neglect more than it takes account of. All forecasting invites counterforecasting. Such contests are often undesirable."

It is perfectly true that during the present time we hear less opinion to the effect that the phase of high prices through which we are now passing is only temporary. Mr. Peycke agreed that most commissions consider only book cost (as distinguished from reproduction cost) in determining value and depreciation for rate-making purposes. But he added:

"This attitude does not change the fact that a return being realized in depreciated dollars is being related to an investment which was made in dollars having vastly greater purchasing power. If we were concerned only with existing investors, this statement might perhaps do no more than identify the victims of an inflationary process. But there is a public interest which goes far beyond a mere question of fairness. Essential enterprises engaged in a public service must have the means to continue to discharge their obligations. It may properly be added, of course, that the treatment of existing investors has an important bearing upon the ability to attract additional capital. Not only are new investors influenced by this consideration, but one of the most important sources of new capital is to be found in the great body of those who already have committed investment funds to the enterprise.

"Since the end of the war, the Bell System has found it necessary to raise about two billion dollars in new capital. It estimates that it will have to raise as much more in the next few years. So far it has been obliged to resort largely to borrowing and its debt ratio is now about 50 per cent. It cannot go on with this process indefinitely. Every consideration of sound management dictates the requirement of a larger amount of new equity capital. The evidence presented in rate cases has been designed to show the need for revenue which will permit a return sufficient to induce this type of investment."

The problem is much more economic than legal. Obviously a utility which happens to have no need for new capital has a constitutional right to earn just as much of a reasonable return as a utility company which does need new capital. On the other hand, telephone companies which have vast requirements for new capital which comes only from investors willing to purchase their securities have, in the view of Mr. Peycke, "a practical economic problem which is not helped much by examining precedents and reading the Constitution."

One of the difficulties in getting this whole subject of inflation *versus* regulation opened up, is the tendency of certain few regulatory officials to regard any such talk as "reactionary." To them a strict cost theory of rate making is the only possible system to be followed and if you even tried to talk about anything else they make smug comments about "old-fashioned horse-and-buggy approach" to regulation, which have been "washed out" by Supreme Court decisions, etc.

Quite to the contrary, this writer submits that a persistent refusal to examine the new situation brought about by the inflationary circumstances is, of itself, a form of regulatory snobbery which is quite reactionary. But it does seem to have the effect of cowing a good many utility executives and their lawyers who fear reflection and comment on their own liberal thought processes.

The time may be at hand when the investor, rather than the regulatory official or company management, will make the real economic situation apparent. When a utility industry cannot obtain sufficient investment to replace its plant at existing high prices because of restrictive regulatory restraints on earnings, the public interest is going to suffer and the public welfare is going to demand a solution regardless of all the pretty theories and accumulative precedents which self-styled liberals present to the contrary. After all, it isn't Supreme Court justices who have to meet the increased payrolls.

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The special house committee investigating the FCC has made its first report to Congress. Chairman Harness (R., Ind.) released the text of his interim report which gives the FCC quite a wigging for stumbling around in the regulatory field of radio regulation.

Most of the Harness committee criticisms contained in the report, go back over the Port Huron Case (involving political censorship of radio station broadcasts), the Scott case (the broadcasting of atheist programs) and even implied some censure for permitting the commission's public relations officer to be present at executive sessions of the commission. All of this has been reported with comment in these pages. Therefore, there is nothing new to be taken up at this time.

On the whole the Harness report struck this reporter as being rather unfair to the commission. It is true, almost by its own admission, that the FCC has been guilty of muddling and confused thinking on these and other matters (such as the "give-away" radio programs) that the Harness committee investigated. But in each and every instance the FCC has obviously been trying to do its duty under the act as it saw it.

After all, the Communications Act does impose on the commission the duty of seeing that no political broadcasts are censored. The Scott decision was simply an example of confused opinion writing by a former commissioner more given to writing essays on social issues than regulatory law. But the decision of the commission itself was admitted by everyone to be correct in that case.

(Please turn to page 38)

THE OPERATOR'S *Corner*

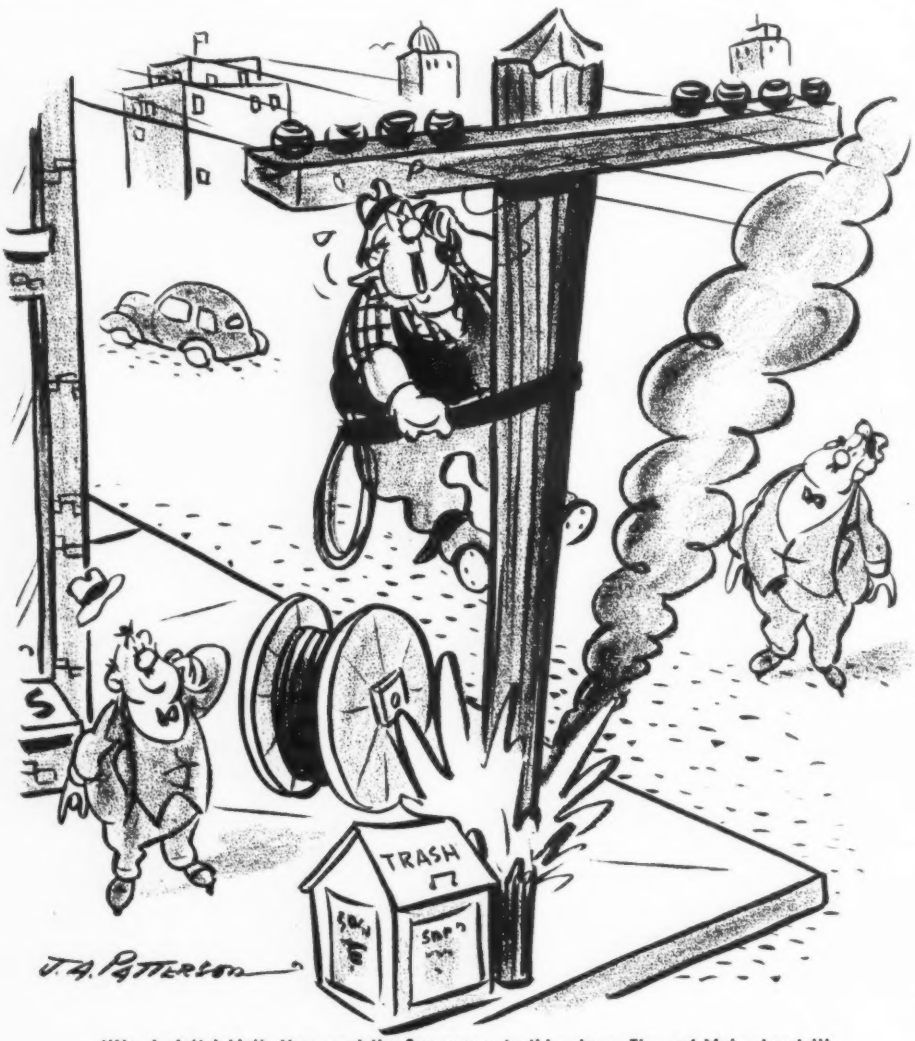
BY
MAYME WORKMAN
TRAFFIC
EDITOR

THE OLD saying, "There is nothing new under the sun," has been debunked on many occasions. This occurred again with the introduction of the voice recorder. It is not only new but in a sense it is also in direct contrast to the telephone code of ethics—the secrecy of communication. In the future we must keep our ears tuned for the gentle "beep" tone occurring about every 15 seconds. At present, the use of recording devices is authorized on telephone lines in interstate and foreign telephone service provided arrangements are made for sounding a warning tone at intervals during the entire time the recording device is connected to a line.

Almost from the time the telephone was invented, secrecy of communication was advocated. A customer's telephone conversation is as personal as his mail and must be treated with the same respect, operators were told.

Operators were, and they are, cautioned against listening-in on telephone conversations. There are state and federal laws making such violation an offense, punishable by fine, imprisonment, or both.

The voice recorder makes a permanent record of a telephone conversation so—customers as well as operators must be alert for that little "beep" sound which indicates a voice recorder is being used.



"No, I ain't jokin'! Now send the fire wagon to th' pole on Elm and Main streets!"

For a number of years, operators have been trained to speak in a natural, softly modulated voice. Therefore, their voices should be favorably recorded. Working under the theory that "the customer is always right," the operator is always polite and courteous. But what about the customer? He is not restricted in his choice of words, as long as he refrains from using obscene language. How will his voice sound when reproduced on a voice recorder?

And the ladies will have something to think about, too, if some of their lengthy conversations are recorded.

Although the voice recorder is privileged to invade the secrecy of communication, there is no change in the status of the operator with regard to listening-in while a conversation is in progress. Her code of ethics remains the same. To "listen-in" is still prohibited, by law and company policy. So, when monitoring on a connection to determine if conversation is still in progress, if she hears voices, she should cut out immediately without letting her finger linger on the listening key.

Traffic Questions

(1) If a customer reports hearing an intermittent tone during conversation, what explanation should be given if he inquires about it?

(2) If a customer objects to the use of a voice recorder and implies that he expects the telephone company to prevent its use, what shall the operator do?

(3) How are theoretical force distributions developed?

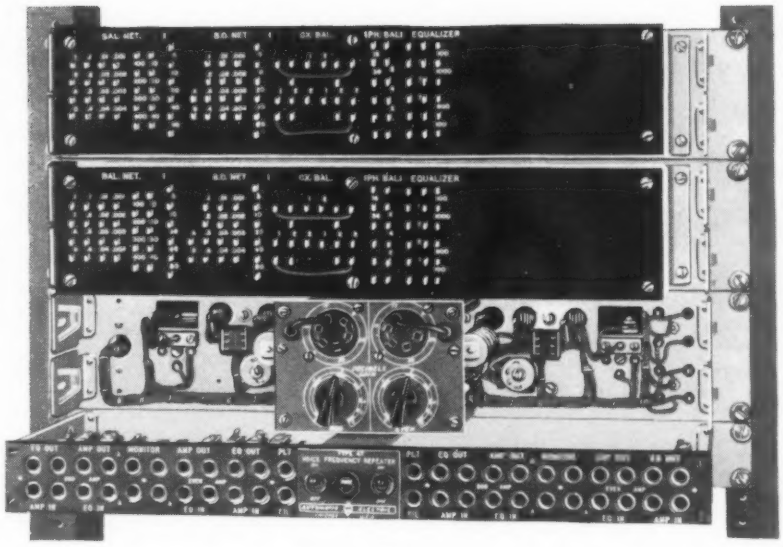
(4) What use is made of theoretical force distributions?

(5) What is the purpose of force assignment?

Answers are presented on page 36.

V V

>> Explained a woman requesting help from the information operator, "The radio announcer said his station was 1490 on the dial, but whenever I dial that number, I always seem to get someone else."



Send for your copy of Circular 1692 giving full details about the Type 47 Voice Frequency Repeater. It contains complete technical data, unit illustrations, typical toll map and examples of the assemblies you will need.

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Automatic Electric Type 47 Voice Frequency Repeater is adaptable to any type of toll circuit, or inter-exchange trunk, and every method of operation. You can use it as an intermediate repeater or as a terminal repeater on two-wire or four-wire circuits.

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THE PLANT MAN'S *note book*

BY RAY BLAIN TECHNICAL EDITOR

WE ARE in receipt of a very interesting letter from Grant Harris, of Page & Hill, Inc., Minneapolis, Minn., in which he refers to an item on this page in the Aug. 28 issue that mentioned the need of a spray gun of some sort to treat the butts of old poles so that their life might be extended. His letter states in part as follows:

"This matter of extending the life of old poles is receiving a great deal of consideration on the part of a great many of our friends among the utility companies. During the past 10 years, one of the power companies in this territory turned one of their older engineers, who since has passed away, loose on this project and he devised a rather ingenious apparatus for spraying poles in the line so as to protect them for their full length.

"In the case of some old power line poles which had been in service for 20 to 30 years, and which we have had under observation during the past six or eight years, we find that the shell rot above the ground was effectively stopped and showed no further deterioration. In this same procedure, they made it a point of spraying the ground around the base of the poles which had been previously butt-treated with creosote and found that this effectively stopped the growth of weeds around the pole, thus protecting it from fire hazards, in addition to fortifying the creosote butt-treatment.

"A 5 per cent Pentachlorophenol solution in petroleum distillate was used as a preservative, and it was found that their problem was one of cutting down the amount of preservative necessary to do the job. In the case of the older poles, the sapwood absorbed this preservative all too readily.

"I happen to have the drawings of this apparatus, and it occurs that not only the telephone companies but also the power companies might want to consider the use of such apparatus in prolonging the life of their older pole lines, particularly under present conditions when many sizes of poles are scarce and labor for installation is also hard to obtain.

"It also occurs that someone might want to consider going into the business of contracting to re-treat these old poles in the line and that some tree-trimming contractors would be interested in such a project.

"In the past, we have seen a common two and a half or three gallon potato bug sprayer used to good advantage in handling Pentachlorophenol solution. This was particularly effective on old poles where, after six or seven years of service, the sapwood seems to absorb this preservative very readily. Our one caution would be to reduce the amount of preservative used to a minimum as it is very easy to place in this old sapwood much more than is required to do an effective job."

It would appear that Mr. Harris has some original ideas on treating old poles in the line. Unquestionably there are many possibilities in the novel arrangement he outlines.

• • •

Mr. Gene Newman, an employee of the Civil Aeronautics Administration, sends us the following formula for the location of telephone cable trouble by measuring the resistance from both ends of the circuit. He states that the basic idea of this system is age-old, but that its advantages are not generally known. When a bridge is not available, an ohmmeter can be used successfully with this system.

Records needed: Accurate length of cable
Accurate record of size of pairs (or actual loop measurement)

Procedure: Clear ends of troubled circuit
Make resistance measurements through fault from both ends of troubled circuit
Calculate as below

Fault resistance—F (ohms)	Feet of conductor per ohm—T (feet)	
Loop resistance of 1 pair—L (ohms)	26 gauge	25
West end res. measurement—WX (ohms)	24 "	40
East end res. measurement—EX (ohms)	22 "	62
	19 "	125
	16 "	250

5000′ # 26 cable, L = 400 Ω

West WX = 206 Ω . F . East EX = 326 Ω

Formulae: $F = \frac{(WX + EX - L)}{2} = \frac{(206 + 326 - 400)}{2} = \frac{132}{2} = 66\ \Omega$

Distance from W $= \frac{(WX - F)\ (T)}{2} = \frac{(206 - 66)\ (25)}{2} = (70)\ (25) = 1750$ feet

Distance from E $= \frac{(EX - F)\ (T)}{2} = \frac{(326 - 66)\ (25)}{2} = (130)\ (25) = 3250$ feet

It has been said: "Conscience gets a lot of credit that really belongs to cold feet."

• • •

We note with interest that a retrieving carriage for span transposition brackets was recently placed on the market. It is sometimes necessary to bring one of these brackets back to the pole position to repair or replace broken insulators. The retrieving carriage is used for this purpose. It is placed on the wire at the pole and pulled by a line from the ground to the bracket location. Then, by pulling the line in the opposite direction, a hook is raised so as to engage the transposition bracket. Thus, the bracket may be pulled back to the pole position.

• • •

A device claimed by its designers to free users from being chained to the telephone during a conversation has recently been placed on the market.

This electronic device is in no man-

ner physically connected to the telephone. Installation consists of merely plugging into an electrical outlet.

Aside from freeing the telephone user from the need of holding the handset during a conversation, it may also be utilized for conference requirements. If the telephone rings during a conference, it is not necessary for anyone to pick up a handset. Yet, everyone present can listen in or take part in the conversation no matter how near or far they may be from the instrument. And, if so desired, according to its inventors, a touch of the finger instantly converts this instrument into a private telephone for individual use only.

• • •

The new Western Electric key telephone, developed by the Bell Telephone Laboratories, has key buttons of clear plastic which can be illuminated by lamps concealed in the set. This instrument may be connected to signal an incoming call and then burn steadily during a conversation to indicate that a particular line is busy.

This new set eliminates the need for separately mounted lamp indicators.

PLANT MAN'S QUIZ

Q. We experience noise trouble when we connect a grounded line to a metallic line through our switchboard. Will it be possible to eliminate this trouble by installing repeating coils in a few cord circuits?

A. Although you probably could eliminate your trouble in this manner, we suggest, instead, that you consider the installation of repeating coils on all of your grounded rural lines.

Repeating coils are often installed at the end of the cable plant in an exchange, and at the point of connection to a grounded rural line. It is a good plan to bring all grounded lines metallic through the cable. With this arrangement, any cord circuit may be used on all lines. If you do not have a large number of grounded lines, this arrangement will prove much cheaper than modifying your cord circuits.

• • •

Q. How can a test receiver be used to detect opens or unbalanced pairs in a telephone cable?

A. The split receiver is sometimes used for this purpose to make approximate tests. This type of receiver may be constructed by modifying any good bi-polar type receiver. Drill a hole through the receiver case and tap a third test lead to the connection between the two receiver coils. The conductors in a cable all have capacitance with respect to each other and to ground. Likewise, all conductors of the same length have approximately the same capacitance with respect to ground.

If a source of alternating current is connected to conductors in a cable, the amount of current flowing will be proportional to the capacity and also the length. If the two test clips of a split receiver are connected to a cable pair, both conductors of which are trouble-free and of equal length, and an alternating current tone is connected to the center tap, current flowing in the two coils will be equal and no tone will be heard in the receiver. If the test loads are connected to a pair, the conductors of which are of unequal length, or one is in trouble, the capacitance of the conductors will be unequal. In this case, the current flowing in the two coils will be unequal and the unbalance will cause a tone to be heard in the receiver. The greater the difference of the capacitance of the two wires of the pair, the louder will be the tone.

The greatest advantage of this method of testing is its speed and simplicity. This method will indicate when a pair is clear of shorts, crosses or grounds in one test. An open may not be clearly indicated in all cases.

• • •

Q. What factors, from a transmission standpoint, should be considered in the design of rural line plant in order to provide a satisfactory grade of service?

A. It is always a safe practice to consider all rural lines as long exchange circuits extending into territory adjacent to the exchange base rate area. These circuits, in general, should be engineered to meet the effective loop loss of the exchange to which they are connected. To insure that transmission involving toll will be as satisfactory for rural as for exchange customers, any neglect in rural plant design is certain to cause inferior transmission on long haul calls. This action will penalize rural service for the particular community as compared to the standards set for the country as a whole.

Maximum effective exchange loop loss considers the sum of the transmitting and receiving losses in any loop in a given exchange and the efficiency of the telephone sets. Any noise, crosstalk or distortion should not exceed the assigned maximum loop loss. For example, if the maximum loop loss of a single office exchange has been determined to be 10 db, then the sum of the above losses, including impairments expressed in db, should not exceed 10 db for the particular type of exchange and for the telephone sets used.

When determining the maximum effective exchange loop loss, it is also necessary to consider the allowable toll terminal loss for the exchange involved. This loss is primarily determined by the maximum exchange loop loss. The toll terminal loss should be determined in each case on the basis of providing the most economical combined exchange and toll plant within the respective primary outlet area.

• • •

Q. In our exchange it is often necessary to install multiple ground rods in order to secure an adequately low resistance ground connection for protection purposes. Our policy is to routinely check our ground resistance at fixed intervals and we often find it necessary to add multiple rods a year or so after the original installation. Our problem is this: Will there be any serious electrolytic effect to either metal if galvanized iron and copper (Copperweld) rods are multiplied together? We have found that there is a measurable galvanic action between these dissimilar metals when placed in our soil.

A. One authority on this subject has furnished the following answer to this question.

Galvanic action between ground rods of dissimilar metals presents no practical difficulty, the action being mainly of academic interest. Theoretically, and actually, however, some galvanic or battery action takes place when zinc (galvanized) and copper (Copperweld) ground rods are placed in the same interconnected or multiple ground connection. The wire connecting the rods together acts as the return path for the currents to the Copperweld rod and then up to the connecting lead. The flow of current from the galvanized rod into the soil could cause some of the metal to be eaten away in addition to normal corrosion, but the amount would tend to be small because of the high resistance of the circuit and the tendency for polarization or equalization of potential at the surface of the rod. In fact, the problem at the connections can be much more serious since poor copper to galvanized joints can develop very high resistance. The best practice to prevent such action would be to avoid two types of rods in a multiple ground installation.

telephony's *SAFETY* bulletins

No. 8—Body Belts and Safety Straps. You place your life in your body belt and safety strap. Read this bulletin for ideas and suggestions to help you make sure that these tools can be trusted and assure a job without accidents.

by FRANK E. LEE

GINGERLY, a telephone lineman climbs up a telephone pole. When the right position is reached, he loosens one snap hook of his safety strap, passes the free end from hand to hand around the pole, and, then, looks as he carefully snaps the hook in the other "D" ring of his body belt. Now, he leans back and goes to work with all the ease and nonchalance of an executive opening his desk to start the day's work.

Every day linemen work high above the ground on telephone poles. Keeping these men safe and preventing accidents is the rugged strength of body belts and safety straps. With reliable tools and careful workmen, pole work is safe.

The important question asked in this bulletin is, how dependable is your body belt and safety strap? When was the last time these tools were given a thorough inspection?

Every time you climb up a pole, place your safety strap around it, and lean back to go to work you place your life in the hands of a piece of leather or fabric. Are you sure these vital pieces of equipment are in good condition? The only way to be sure is to establish and maintain a thorough, regular inspection and cleaning program for all climbing equipment.

CAUSES OF LEATHER DETERIORATION

The worst enemy of body belts and safety straps is drying out and general deterioration of the leather and fabrics used in their construction. This general process of aging is accelerated if the belts and straps are neglected. However, with simple periodic attention the safe life of these important pieces of a telephone lineman's equipment can be extended for many years.

The aging and drying process will also be quickened by dirt gathering on the leather, as well as by moisture collecting on the belt and strap. For occasionally, a body belt and safety strap will become quite damp while a lineman is working in a light drizzle or along a pole line immediately after a storm. All of these factors tend to shorten the safe life of the equipment.

INSPECTION

As a general rule, body belts and safety straps should be inspected and cleaned at least once every three months. All items made of leather should be checked for cracks. The simplest method is to roll the belt or strap through a loop approximately 1½ inch in diameter all along its length. Any cracks other than superficial surface marks indicate the leather no longer assures safety and replacements are advisable.

Next be sure all rivets are in place and in good condition. Those missing should be replaced promptly.

"D" rings should be of drop forged steel construction. Inspect for knicks or deep gouges which can be caused by improper handling of a body belt. "D" rings damaged in this manner are weakened and may break if subjected to any unusual strain. Replacement of defective ones is an excellent safety precaution.

Also check all tool holder loops with which the body belt may be equipped. An excellent practice is to remove any non-standard tool holding loops from areas near the "D" rings. A number of serious accidents have occurred in the past because telephone linemen have snapped safety straps into loops of wire fastened near one of the "D" rings. The wire loops, added to permit snapping more tools onto the belt, broke or pulled loose under the weight of the linemen. From this point on anything can, and did, happen.

Safety snaps should be inspected for knicks or surface damage as indicated for "D" rings. The keeper must be free-working in order that the hook will remain engaged with the "D" ring at all times. To test the reliability of the snap hook and keeper, attempt to disengage the snap hook from the "D" ring without opening the keeper.

Leather safety straps should be inspected for cracks as outlined for inspection of body belts. Any straps that are worn in the center to less than three quarters the thickness at the ends should be replaced. If the strap is made of fabric, replace when surface wear has exposed the colored inner plies.

WASHING LEATHER BELTS

If, after the foregoing inspection, the leather belts are found to be in safe condition they should be washed and treated. To remove surface dirt and to clean the pores of the leather, wash with the suds only of a mild castile soap. In this operation use a sponge or a soft cloth and avoid soaking the leather with water. Next remove the soap and surface moisture with a clean soft cloth and hang the belts to dry in the air. Avoid hanging or placing the belt on a radiator or too near a source of heat.

After the belts have dried for a few minutes, or as long as required to become thoroughly dry, rub a good grade of saddle soap into the leather. At every other washing treat the leather with neatsfoot oil in place of saddle soap. Neatsfoot oil should be applied heavily; left to soak in and dry overnight; then, the next day wipe off the excessive oil with a clean, soft cloth.

STORING BODY BELTS AND SAFETY STRAPS

Body belts and safety straps should be stored where they will not be subjected to damage by sharp tools and climber gaffs. Many operating companies have installed hooks on which body belts and safety straps can be hung in protected compartments on construction, installation, and maintenance truck bodies. If the belts must be stored indoors hang in a cool location away from direct heat.

HANDLING BELTS AND STRAPS

A good plan is to handle belts and straps carefully. Lay the belts down when taking them off after a pole job is completed. Avoid throwing them on the ground or into a truck compartment because rough handling may weaken the "D" rings, snaps or rivets.

USE OF BODY BELT AND SAFETY STRAP

The actual techniques of using a body belt and safety strap when working on poles and other high places can best be learned on the job from an experienced lineman. However, these safety items should be stressed:

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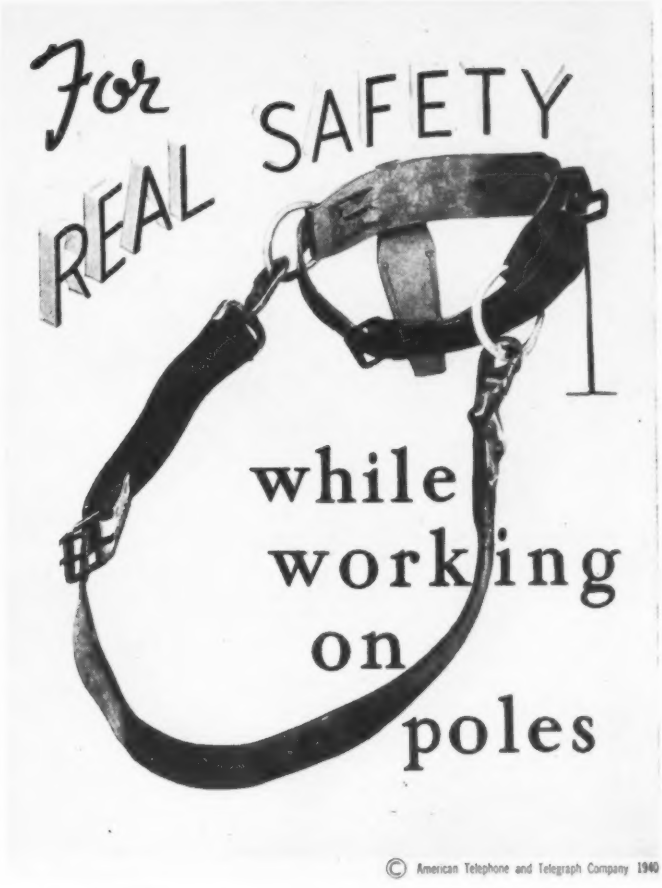

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(1) Always use the body belt and safety strap when working aloft on poles or other high places.

(2) Wear the body belt around the hips. A belt worn too high will become tiring and uncomfortable.

(3) Keepers on snap hooks should face out from the body when the belt is in use around a pole.

(4) Transfer the free end from one hand to the other when placing the safety strap around a pole.

(5) *LOOK*—make sure the snap hook is engaged in the "D" ring. Don't trust the click of the keeper.

(6) The safety strap should not be dangling from one hook only when ascending or descending a pole.

These precautions in the use and care of body belts and safety straps require a little time and thought. However, when your very life depends upon the use of this equipment, you have time for safety.

A Three Job-Juggler Raises Christmas Trees in Spare Time

Ralph Emerson Heile may not be the busiest man in the world but he figures he has as good a claim as anyone to the title.

He is the president of the telephone company in Transfer, Penn., a little community of 300, one of its part-time linemen, and works a regular eight-hour trick at the Westinghouse Electric Corp. plant in nearby Sharon.

In addition, he raises Christmas trees for sale and in his "spare time" tends a sizeable vegetable garden.

"My job of wireman at Westinghouse is the only one I have that requires a full eight hours every working day," he explains.

"As telephone company president my duties can be fitted in during afternoons and evenings and on week-ends. I'll admit, though, that spare time is kind of scarce."

Thirty-five-year-old Mr. Heile blames his triple duties on a work slump in 1937.

"Instead of lying around the house," he said, "I took a job as a lineman with the small telephone company. The experience I got maintaining the telephone lines helped me land the job with Westinghouse. A year later the telephone company's board of directors decided to elect me president."

Mr. Heile has been president of the Pymatuning Independent Telephone Co. for five years, but he draws his pay for being a lineman.

"The job of president carries no salary," he said. "I stick with it because I like the work."

V V

Operators Explain Dial Service In Seven Languages

Chicago operators skilled in "double talk" finished a two and one-half week job at the Humboldt exchange of the Illinois Bell Telephone Co. on Sept. 15.

This "double talk" is not the common variety. The 65 operators had to pool their talents to talk a total of seven languages.

Reason for this was to be sure all 40,000 subscribers on the Humboldt exchange would have no difficulty when their telephone service was changed to dial at midnight on Sept. 18.

Every subscriber was called and dial service explained to him. To be certain each had the matter clearly in mind, the operators talked in the language most clearly understood by the user.

Top number of foreign language conversations was 2,000 in Polish. Smallest total was a dozen in Armenian. In addition to English, other languages spoken were Italian, Greek, French and German.

Each subscriber was asked to make a test call back to the operator. A tape recording machine in front of the tester showed if the call was made properly.

This job was the last big one before the dial cutover which put in use the new, four-story $12,500,000 Humboldt exchange.

The SALE that needs no "SELL"

There's no need to "sell" a man on re-ordering Masterphone—success and satisfaction with the first order always clinch subsequent sales more solidly than any salesman could. And no wonder! For Masterphone's time-saving, profit-building benefits are the most convincing proof a telephone man could want.

Installation, for example, is unbelievably *easy!* Both wall and desk sets and dial or common battery housings are interchangeable on the same baseplate in a matter of moments. (Which means fewer parts to stock—and lower inventories than ever before!) Adaptations to any type of service are simple, too. No color-codes to remember, no soldering, no mess!

And *maintenance?* Never *faster,* never *simpler!* All components are mounted in full view for rapid inspection, with plug-in type condenser and induction coil. Ringers are of the same basic design for all phones, and the universal circuit is permanently wired and protected.

Performance? Masterphone's superior transmission and reception make a loyal booster of every subscriber. For the anti-side tone Triad circuit and controlled-response transmitter and receiver set new standards for finer telephony.

Join the growing list of telephone companies who are standardizing with Masterphone. Send *your* order for 1000 Series Masterphones to Kellogg *today!*

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THE TELEPHONE THAT'S YEARS AHEAD

KELLOGG SWITCHBOARD AND SUPPLY COMPANY
6650 SOUTH CICERO AVENUE • CHICAGO 38, ILLINOIS

D-1000 Desk Masterphone with dial on universal baseplate

1070 Desk Magneto Masterphone (Also in wall model)

1100 Manual Wall Masterphone

D-1000 Dial Wall Masterphone

1000 Manual Desk Masterphone

All Telephones shown above use the same baseplate as D-1000 Desk Masterphone.

Courts and Commissions

Allows Nebraska Company Higher Rates at 30 Exchanges

Higher rates at its 30 exchanges have been granted to the Nebraska Continental Telephone Co., Columbus, by the Nebraska State Railway Commission. The new rate schedule will increase gross annual revenues approximately $132,379, it is estimated (TELEPHONY, June 30, p. 30.)

For the four principal cities served, the following company requested rates were authorized: Kearney and Columbus—*Business*, one-party, $6.25; two-party, $5.25; rural metallic, $4.25. *Residence*, one-party, $3.75; two-party, $4.25; rural metallic, $3.00. Albion and Ord—*Business*, one-party, $5.25; metallic, $4.25. *Residence*, one-party, $3.50; four-party, $2.85; metallic rural, $3.00.

The proposal for a three group setup for the entire system was turned down. The commission held that the portion covering the smaller exchanges did not give a proper distribution of increase and substituted a grouping of its own comparable to the rates allowed for small exchanges in the orders given the Northwestern Bell and Lincoln Telephone & Telegraph companies. As finally determined, the prescribed rates are somewhat higher than in those orders because the Nebraska Continental exchanges are more widely scattered, with longer line distances and larger overhead.

For the smaller exchanges rates authorized were: Group A—Up to 250—(Bloomington, Brunswick, Burwell, Edison, Greeley, Lindsay, Monroe, Orchard, Platte Center, Republican City, Riverdale, Stamford, Sumner and Wilsonville). Business: one-party, $4.25; rural grounded, $3.00; rural metallic, $3.50. *Residence:* one-party, $2.50; four-party, $2.00; rural grounded, $1.75; rural metallic, $2.25.

Group B (Battle Creek, Beaver City, Genoa, Hildreth, Newman Grove, Orleans, Palmer and Tilden) *Business:* one-party, $4.50; rural grounded, $3.25; rural metallic, $3.75. *Residence:* one-party, $2.75; two-party, $2.50; four-party, $2.25; rural grounded, $2.00; rural metallic, $2.50.

Group C—from 501 to 750—(Alma-Franklin, Madison and Neligh) *Business:* one-party $4.75; rural grounded, $3.50; rural metallic, $4.00. *Residence:* one-party, $3.25; four-party, $2.60; rural grounded, $2.25; rural metallic, $2.75.

Although eight communities entered a protest against higher rates unless service conditions were bettered, the commission found that increased costs of material and supplies plus higher labor costs justified granting the request as fair, reasonable and non-discriminatory.

As of Dec. 31, 1947, the company had 14,377 stations, of which 6,737 were automatic, 2,872 common battery and 4,936 magneto type.

V V

Five Minnesota Independents Receive Rate Increases

Five Independent companies were recently granted rate increases by the Minnesota Railroad & Warehouse Commission, effective the first billing date following Sept. 30. They are:

Bellingham (Minn.) Telephone Co.:

Class of Service	*Present Gross Rates*	*Approved Gross Rates*
Individual line, business	$2.75(a)	$4.00(b)
Two-party line, business	2.25(a)	3.50(b)
Individual line, residence	1.75(a)	2.75(b)
Two-party line, residence	1.50(a)	....
Four-party line, residence	1.25(a)	2.25(b)
Rural multi-party, residence	1.75(a)	2.75(b)
Rural multi-party, business	2.50(a)	3.25(b)

(a) Rates billed quarterly. A discount of 75 cents to be allowed on all gross rates if bill is paid on or before the 15th of the first month; 50 cents if paid on or before the 15th of the second month of the quarter; and 25 cents if paid on or before the 15th of the third month of the quarter in which service is rendered.

When telephone rentals are fixed at more than $2 per month gross, an additional discount of $2 is allowed if paid one year in advance, $1 if paid 6 months in advance.

(b) Local rates billed monthly, and a discount of 25 cents to be allowed if paid by the 15th of the month for which service is rendered. Rural rates to be billed quarterly, and a discount of 75 cents to be allowed if paid by the 15th of the first month of the quarter for which service is rendered.

Eden Valley Telephone Co.:

Class of Service	*Present Gross Rates*	*Approved Gross Rates*
Individual line, business, C.B.	$3.50(a)	
Individual line, business, Mag.	3.00(a)	$4.25(a)
Two-party line, business, Mag.	...	3.75(a)
Individual line, residence, C.B.	2.25(a)	...
Individual line, residence, Mag.	2.00(a)	2.50(a)
Four-party line, residence, Mag.	1.75(a)	2.25(a)
Rural multi-party line, residence	2.00(a)	2.50(a)
Rural stations owned, business	...	3.00(a)
Extension stations, business	.75 Net	1.00 Net
Extension stations, residence	.50 Net	.75 Net
Service switching stations	...	.60 Net
Additional deskset or handset, rural	.25 Net	*** See below

(a) All rates, with the exception of season rates, are to be billed monthly in advance with a discount of 25 cents to be allowed on all gross rates if paid on or before the 15th of the month in which service is rendered. Season rates are to be billed and payable for the season in advance.

***—An additional charge of 25 cents per month for handset instruments to four-party line residence subscribers and rural multi-party subscribers.

Kimball (Minn.) Telephone Co.:

Class of Service	*Present Net Rates*	*Approved Gross Rates*
Individual line, business	$2.50	$4.25(a)
Two-party line, business	...	3.75(a)
Individual line, residence	1.50	2.50(a)
Four-party line, residence	1.25	2.25(a)
Rural stations owned, grounded	1.50	2.00(a)
Rural stations owned, metallic	1.75	2.50(a)

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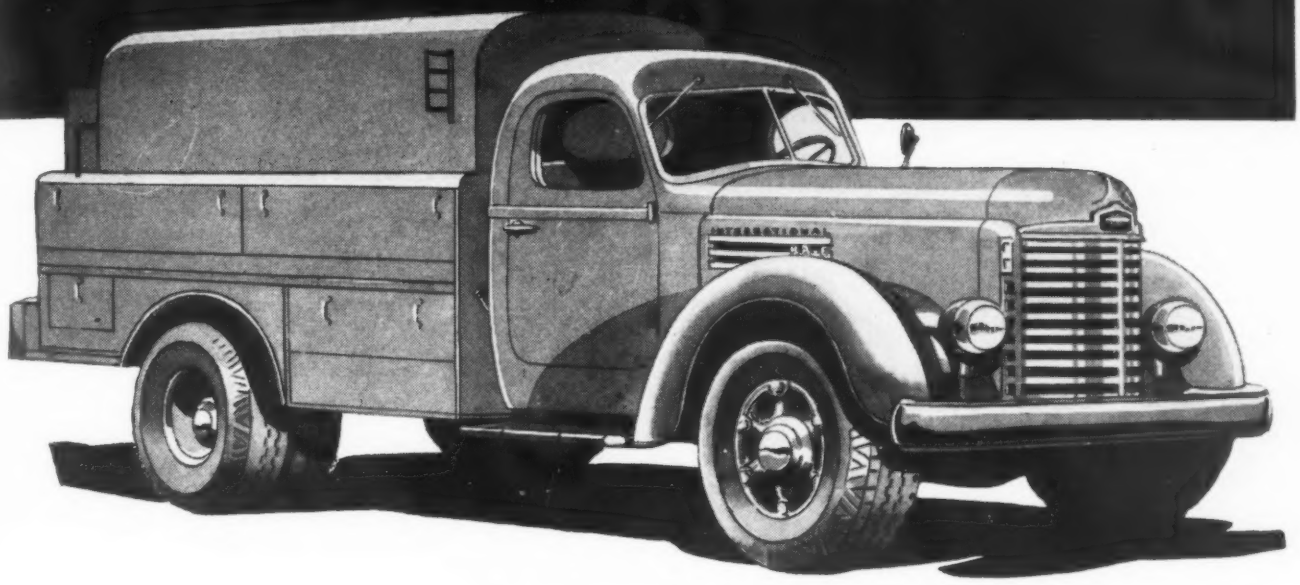

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INTERNATIONAL Trucks

Rural stations, owned, business	...	3.00(a)
Extension stations, business	...	1.00 Net
Extension stations, residence	...	.75 Net
Service switching stations	.35	.60 Net
Add'l. charge— hand sets, local or rural	.25	*See below

(a) All rates with the exception of season rates, are to be billed monthly in advance with a discount of 25 cents to be allowed on all gross rates if paid on or before the 15th of the month in which service is rendered. Season rates are to be billed and payable for the season in advance.

*—An additional charge of 25 cents per month for hand set instruments to four-party line residence subscribers and to subscribers on rural multi-party lines.

Minnesota Telephone Co., Minneapolis, at the following exchanges:

Kandiyohi

Class of Service	*Present Net Rates*	*Approved Net Rates*
Individual line, business	$2.50	$3.75
Two-party line, business	1.50	3.25
Business, extension	.50	1.25
Individual line, residence	...	2.75
Two-party line, residence	1.25	2.50
Four-party line, residence	...	2.25
Residence, extension	.50	1.00
Rural multi-party, metallic	1.50	2.50
Rural, business	1.75	3.00
Switching stations	...	.75

Svea

Class of Service	*Present Net Rates*	*Approved Net Rates*
Individual line, business	$2.50	$3.75
Two-party line, business	1.75	3.25
Business, extension	.50	1.25
Individual line, residence	...	2.75
Two-party line, residence	...	2.50
Four-party line, residence	...	2.25
Residence, extension	...	1.00
Rural multi-party, metallic	1.50	2.50
Rural, business	...	3.00
Switching stations	.35	.75

Raymond

Class of Service	*Present Net Rates*	*Approved Net Rates*
Individual line, business	$2.50	$3.25
Two-party line, business	...	2.75
Business, extension	.50	1.00
Individual line, residence	1.50	2.25
Two-party line, residence	1.25	2.00
Four-party line, residence	...	1.75
Residence, extension	50	.75
Rural multi-party, metallic	2.00	2.00
Switching stations	...	.75

Willmar

Class of Service	*Present Net Rates*	*Approved Net Rates*
Business, extension	...	$1.25
Four-party line, residence	...	2.25
Residence, extension	...	1.00
Rural multi-party, metallic	$1.50	2.00
Rural, business	1.75	2.75

Kennedy

Class of Service	*Present Net Rates Under Magneto Service*	*Approved Net Rates Under Dial Service*
Individual line, business	$3.25	$3.75
Two-party line, business	2.75	3.25
Extension stations, business	1.00	1.25
Individual line, residence	2.25	2.75
Two-party line residence	2.00	2.50
Four-party line, residence	1.75	2.25

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BRAND NEW SIGNAL CORPS SURPLUS

No. 444-A. For crimping eyelet tip and ring cords without removing the insulation.

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No. 316. For attaching and removing plugs from cords. Adjustable to different types of plugs.

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No. 312-B. For cutting off the old end and also severs the braid $1\frac{3}{16}$" from the end.

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Rural multi-party, metallic	2.00	2.50
Rural multi-party, grounded	1.75	...
Rural business	...	3.00

Approved rates for the Minnesota company's Kennedy exchange become effective upon the first billing date following certification by the commission that dial service has been installed.

Watkins (Minn.) Telephone Co.:

Class of Service	*Present Gross Rates*	*Approved Gross Rates*
Individual line, business, C.B. ...	$3.50	...
Individual line, business, Mag. ..	3.00	$4.25
Two-party line, business, mag. ..	...	3.75
Individual line, residence, C.B. ..	2.25	...
Individual line, residence, Mag...	2.00	2.50
Four-party line, residence, Mag...	1.75	2.25
Rural multi-party, Gr.	1.75	2.00
Rural multi-party, Met.	2.00	2.50
Rural stations owned, business..	...	3.00
Extension stations, business	...	1.00 Net
Extension stations, residence	...	.75 Net

An additional charge of 25 cents per month for handset instruments to four-party line residence subscribers and to subscribers on rural multi-party lines.

V V

Denies Petition for Service From NW Bell Telephone Co.

The Minnesota Railroad & Warehouse commission on Sept. 22 denied the requests by residents of Inver Grove and Rosemount Townships for a discontinuance of service rendered them by the Hastings (Minn.) Telephone Co. in favor of service by the Northwestern Bell Telephone Co.

In rendering the adverse decision the commission stated:

"The area mentioned in the petition is situated about equal distance between the business centers of South Saint Paul and Hastings, or approximately 10 miles by highway in each direction.

"It will be noted that the petition is silent with respect to the adequacy of the service furnished by the Hastings Telephone Co. However, witnesses for the petitioners directed most of their testimony to this subject. The public is entitled to reasonably adequate telephone service and upon complaint to the commission the matters complained of would be corrected. The petitioners herein never filed such a complaint, nor has a complaint been filed by anyone concerning the service furnished by the Hastings Telephone Co.

"There was some testimony offered to the effect that if the Northwestern

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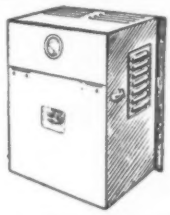

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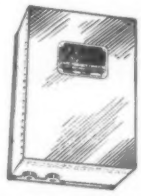

Holtzer-Cabot, Leich, and Lorain Sub-Cycle ringing machines, including machines for harmonic ringing

Whatever your requirements, for maintenance or new construction, there's no easier way to get them than by calling your near-by Graybar office.

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Bell Telephone Co. served the area under consideration that it would result in the elimination of a considerable amount in toll charges incurred by the petitioners. If the elimination of toll charges were to be considered a public convenience there would be demand for the elimination of these charges from all parts of the state. This would not be in the public interest as a large majority of the subscribers rarely, if ever, use toll service but would be required to help make up the loss so incurred by paying higher rates for local service.

"The Northwestern Bell Telephone Co. has no legal obligation to extend its service into areas already being served by other telephone companies, nor can the commission create such an obligation. There has been placed with said company 7,000 orders for service by persons that have no telephone service at all, and 35,000 orders for regrades to a better class of service by present subscribers. These orders cannot be filled at present due to the shortage of facilities. It appears that the company should fulfill its obligations in its own area before considering the extension of facilities to areas now being served by other companies."

V V

Postpones Presentation of Evidence in Bell Rate Case

Presentation of rebuttal evidence by the Oklahoma Corporation Commission in the Southwestern Bell Telephone Co. rate case has been postponed until Oct. 15, the next open hearing date, according to an announcement by commission attorney James Welch.

Mr. Welch stated that commission experts are making a re-study of the company's permanent rate application in consequence of the action by the state supreme court in granting temporary higher rates to the SW Bell, to be effective until the permanent rate case is settled (TELEPHONY, July 24, p. 36).

The telephone company entered no objection to the postponed hearing although it has requested that the hearings be concluded as early as possible.

Meanwhile, telephone subscribers are protected by a supersedeas bond guaranteeing that the company will make the necessary refunds if the final or permanent rates prove to be lower than the temporary schedules now in force.

V V

Schedules Hearing Date

The hearing on the application of the Southern Bell Telephone & Telegraph Co. for permanent authority to raise its Kentucky rates by more than $2,000,000 a year will be resumed Nov. 9 (TELEPHONY, July 17, p. 23).

Company officials, and members of the Kentucky Public Service Commission concluded a two-day conference on Sept. 21 and agreed on the resumption date.

Virginia Independent's Rate Increase Approved

Rate increases asked by the Lexington Telephone Co., Staunton, Va., were granted Sept. 22 by the Virginia Corporation Commission (TELEPHONY, Sept. 4, p. 29).

The commission held the new rates to be "not unjust or unreasonable" and ordered the increases to become effective Oct. 1. They will apply at the Lexington and Buena Vista exchanges.

V V

Minnesota Sale Authorized

Sale of the Eden Valley (Minn.) Telephone Co. to Jack L. Fernbaugh was recently authorized by the Minnesota Railroad & Warehouse Commission.

V V

Authorize Sale of Company

Stockholders of Tuscola Farmers Telephone Co., Millington, Mich., have authorized the sale of the company to W. H. Nickless & Son of Bay City. The company was organized 25 years ago and has 600 subscribers.

Answers to Questions On Page 22

(1) Explain to the customer that a telephone recorder may have been used saying, for example, "A tone repeated at about 15 second intervals indicates that a telephone recorder was used at the other station."

(2) Tell the customer that the company does not control the use of recorders, but that he can request the other party not to use it and will always know if one is being used by the tone signal.

(3) Theoretical force distributions are developed through the use of mathematical calculations and operator requirement tables. They are based upon the estimated distribution of calls or units, the local level contemplated in the coefficients, the number of working positions and team size, and the experience of the operating staff.

(4) They are used as a guide in determining hourly or half-hourly force requirements, and are prepared only for switchboards where the staff required in several individual hours is too large to be determined by personal observation.

(5) The purpose is to schedule at the switchboard the force needed to assure that an even grade of service is rendered economically from day to day and by periods of the day.

V V

Summary of Commission Rulings and Hearings

Illinois Commerce Commission

Sept. 21: Hearings on rate increase applications of Farmers Telephone Co. of Lee County, Ashton, and Mutual Telephone Co., Alpha.

Sept. 22: Hearing on application of Milford (Ill.) Telephone Co. for increased rates at its Milford and Stockland exchanges.

Sept. 22: Hearing on application of Middle States Telephone Co. of Illinois, Park Ridge, for permission to operate an exchange in North Pekin.

Kansas Corporation Commission

Oct. 4: Hearings on rate applications of Mijo Telephone Co., Spring Hill, for its Spring Hill and Stillwell exchanges; of the Tri-County Telephone Co. for its Parker, Greeley and Rantoul exchanges; and of the German-American Telephone Co., Victoria.

Oct. 15: Hearings on applications of American Telephone Co., Abilene, for rate changes at its Alma, Luray, Lyndon, Troy, Wathena, and Westmoreland exchanges.

Oct. 25: Hearing on complaint against Ellis (Kan.) Telephone Co. by Walter L. Huck and Arthur H. Baugher regarding poor service.

Louisiana Public Service Commission

Sept. 28: Commission investigation of Barnett Exchange Telephone Co., Zachry, regarding alleged unsatisfactory service.

Sept. 28: Hearings on rate applications of Reserve (La.) Telephone Co. and Bethany-Converse Telephone Co., Greenwood.

Oklahoma Corporation Commission

Oct. 15, Nov. 12, and Dec. 29 and 30: Hearings on evidence contesting application of Southwestern Bell Telephone Co. for increased intrastate exchange rates in Oklahoma.

Oct. 27: Hearing on application of E. K. Cross Telephone Co., Webbers Falls for new hearings on request for increased rates. Company seeks higher rates than those recently recommended by commission trial examiner.

Nov. 9: Continued hearing on application of Moore residents requesting adequate service from Southwestern States Telephone Co., Brownwood, Tex.

Wisconsin Public Service Commission

Sept. 28: Hearings on application of Knowlton (Wis.) Telephone Co. and Mosinee (Wis.) Telephone for authority to increase rates.

Sept. 29: Hearings on applications of Weyauwega (Wis.) Telephone Co. and Urban Telephone Co., Clintonville, for authority to increase rates.

Sept. 30: Hearing on application of Commonwealth Telephone Co., Madison, for an investigation of its need for increased rates.

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SA-42	26 pair less stub

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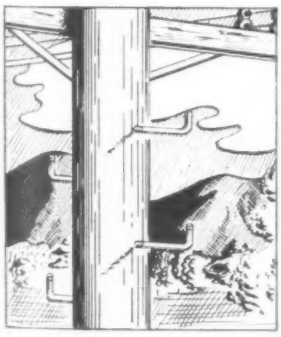

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ABC of the Telephone

(Concluded from page 19)

windings. These windings may serve one or more of the following purposes:

(1) The secondary winding may be used to hold the relay operated after the primary circuit is opened.

(2) The secondary winding may be used in conjunction with the primary winding for fast operation of the relay under certain conditions.

(3) The secondary or tertiary winding may be used to counteract the operating or holding winding, and thus release the relay.

When clearing trouble in circuits equipped with multiple winding relays, tests should be made to determine whether or not these windings are open.

Reversed PBX Trunk

All central office trunks connected to a PBX switchboard must have battery connected to the ring at all times. A reversed central office trunk will cause a reversal of battery through the cord supervisory relays when placed upon a trunk connection. This will cause a momentary release of the supervisory relay because of a reversal of the magnetic field. If the board is close to the central office, the relay will energize in a reverse direction and will reoperate.

However, if the board is located toward the extreme limits of the exchange area, the relay usually fails to reoperate. As a result of this condition, only one trunk of a group may cause reports of cut-off, permanent disconnect, etc. In many instances, the splitting relays in the cord circuit will operate and release in sequence, causing a continual buzzing condition on the trunk.

Again the foregoing trouble condition emphasizes the fact that the repairman should be thorough in his original analysis. In the above instance, failure to test all trunks may result in an improper analysis of the reported case of trouble.

"Don't Answer" Report on PBX Trunk

Reports of this type should be carefully tested by the repairman. Include all trunks in this test. A customer failing to reach a PBX board because of a no line signal usually flashes the central office operator and registers a complaint.

In recalling the order, the central office operator is liable to place the call on an adjacent trunk and the PBX operator receives a signal plus a complaint from the calling party. Usually the PBX operator will report a "Don't answer," on the trunk by which the customer reached the PBX. To repeat, thorough analysis of all conditions should be the first step in the clearing of any reported case of relay circuit trouble.

(To Be Continued)

QUESTIONS AND TENTATIVE ANSWERS

COMMERCIAL

(1) Is there a minimum service period?

A. One month.

• • •

(2) Is there an installation charge, move and change charge?

A. Yes.

• • •

(3) Is there a minimum monthly service charge?

A. Yes, for messages within an area defined as the "Mobile Service Area" (usually within 24 miles of the principal exchanges). This charge includes a specified number of message units.

• • •

(4) Is there a fixed monthly rental charge in addition to the minimum monthly message service charge?

A. Yes, when the telephone company provides the mobile telephone equipment.

• • •

(5) Can charges for messages originating at mobile stations be reversed?

A. Messages within the mobile service area will all be considered as sent paid and reversal of charges on such messages is not contemplated. Charges for messages which involve a toll charge may be reversed.

In the Nation's Capital

(Concluded from page 21)

As for the presence of the FCC's public relations officer in executive session, it might have been a good thing if the FCC had started that practice sooner. This public relations officer's memorandum, following the commission's blunder in the Scott Case, was a prime example of good common sense and practical advice which the FCC would be smart in following from now on. Surely there is no law against the commission taking good advice no matter where it comes from, including its own staff members. The Scott Case would never have become a controversial issue if the views expressed in the so-called "Gillingham memorandum" had been followed originally.

The important point, however, is what Congress may *do* to the FCC, following this Harness committee investigation. That, after all, is the only matter of real concern to the telephone industry. Judging from the way the Harness group is sniping at the FCC, it looks like a fair bet that all-around ripper legislation may be the order of the day, if the Republicans control the 81st Congress.

What this would all boil down to would be a Republican Congress just looking for an excuse to fire a Democrat organized commission and to hire some Republicans to take its place. This sounds like cold blooded political patronage and it is. But the Republicans have a good precedent. That is exactly what the Democrats did in the first New Deal when they took over the control in Washington and found the old Republican organized Federal Radio Commission. They ripped the thing to pieces and, in its place, brought forth the present FCC. Will a triumphant Republican administration do likewise next year? Stranger things have happened.

V V

>> After hiding $300 of their vacation money in a telephone directory in their New York hotel room, two school teachers went for a walk. New books were exchanged for the old, in their absence, and it took five hotel porters two days to find the cash before a cellar-full of directories could be carted away.

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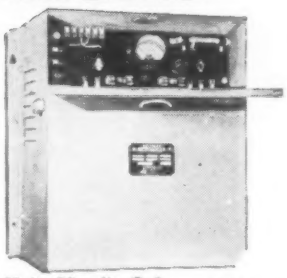

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E. A. Campbell Transferred East by Kellogg

E. A. Campbell, Alexandria, Minn., sales representative for the Kellogg Switchboard & Supply Co., Chicago, Ill., recently was transferred to the territory that includes eastern Pennsylvania, eastern New York and the New England states, according to an announcement by F. M. Parsons, sales manager. Mr. Campbell formerly represented the company in western Minnesota and North Dakota.

Mr. Campbell entered the telephone field in 1937 with the Leich Electric Co., Genoa, Ill. He later worked in the electrical department of the Illinois Central Railroad for three years. During this period he attended night school and studied electrical engineering. In 1943, he went to work for the Kellogg company and, after two years in the plant, was appointed sales representative in the Minnesota-North Dakota area.

He is the son of John A. Campbell, Columbus, Ohio, also a Kellogg sales representative. After graduating from Ohio Northern University, Mr. Campbell coached basketball at Mt. Victory, Ohio, and later became assistant football coach at Case University, Cleveland. In 1930-31 he was coach of the Central Junior High School track team at Cleveland. It was at this school and under his tutelage that Olympic track star Jesse Owens first received recognition.

Mr. Campbell takes over much of the territory formerly traveled by L. B. Pitcher, who last May was transferred to his home state of Illinois as sales representative for the Kellogg company.

New Gar Wood small ditch digger used in cable installation.

New Cable Ditching Machine Announced

One of the smallest excavating machines ever built, the 401 Ditcher, has been announced by Gar Wood Industries, Inc., Findlay Division, Findlay, Ohio. It digs a ditch as narrow as six inches wide (see cut). Digging buckets for eight inches are available. The unit digs to a four-foot depth. It weighs 6,580 lbs. and is powered by a 47 horsepower (at 1600 r.p.m.) industrial gasoline engine. Maximum length is only thirteen feet, nine inches, and width is four feet, four inches.

Digging speeds range from 2.19 to 14.7 feet per minute with digging feeds from 245 to 538 feet per minute, the company states.

The excavator boom is an all welded steel box type and is raised and lowered by means of self locking worm hoist, powered directly from engine transmission. Spoil is discharged to both sides of the ditch. Crawlers, driven from forward by a heavy truck type differential, are non-clogging and have cast alloy steel treads. The left side crawler is adjustable vertically so that the machine can maintain an "even keel" and dig a vertical ditch when operating along a slope or with one crawler on a curb.

A number of telephone companies are using the 401 Ditcher to bury cable, the company reports.

Bulletin 401 is available on request to the Gar Wood company.

V V

Callahan Joins Federal's Radio-Telephone Division

Justin J. Callahan has joined Federal Telephone & Radio Corp., Clifton, N. J., as sales representative covering the New England territory for Federal's mobile radio division.

Weighs but 6½ pounds!

Easily pulls 500 pounds on any wire or messenger stringing job!

Compact — Quickly snaps on tool belt!

Tested to 50% overload!

"Safety-Load" Handle bends before any part of puller can give!

Handle can be used as lever or high-speed crank!

For use on heavier jobs — the "Safety-Pull" Ratchet Hoist; to stretch heavy guys or cable, lay underground conduit, etc. ¾ ton capacity model weighs but 14 pounds; eight other models handle up to 15 tons.

Ask your distributor or write for bulletin NMP-1 — shows an amazing variety of time-saving uses for the "Mighty-Midget."

Hoist Jacks; Load Binders; Differential Chain Hoists; Electric Hoists; Spur Geared Chain Hoists; Trolleys; Special Utility Maintenance Tools.

COFFING HOIST COMPANY

DANVILLE, ILLINOIS

J. J. CALLAHAN

Mr. Callahan, a native of Brooklyn, N. Y., has been associated with radiotelephone sales for some years and also has been active in marine and aviation instrument engineering.

During the war Mr. Callahan served in the Merchant Marine and later became deck training officer in the Maritime Service. Mr. Callahan resides in Somerville, Mass., and his sales operations are carried out from FTR's New England headquarters, 43 Leon St., Boston, Mass.

V V

Pacific T&T Gains 1,000,000 Telephones Since V-J Day

In an expansion unparalleled in its entire history, The Pacific Telephone & Telegraph Co. has added 1,000,000 telephones since V-J day, it was announced Sept. 14 by M. R. Sullivan, the company's president, during the course of his welcoming address to the Telephone Pioneers of America at their 1948 General Assembly in San Francisco.

While Mr. Sullivan was talking, a telephone on the speaker's table rang and he was greeted by the installer of the millionth telephone at the residence of Mr. and Mrs. James C. Stone, in Sacramento, Calif. The ensuing conversation, during which Mr. Sullivan spoke with Mrs. Stone, was amplified for the benefit of the audience in San Francisco. Mr. Stone, a veteran, works for the State Department of Education in Sacramento. The Stone family includes two small daughters.

V V

» An Ohio newspaper recently made an error in running an ad for telephone operators in the columns for "Help Wanted — Male." The results were startling. In the first hour, 20 men had applied, but none were hired.

FOR SORTING, COUNTING and WRAPPING

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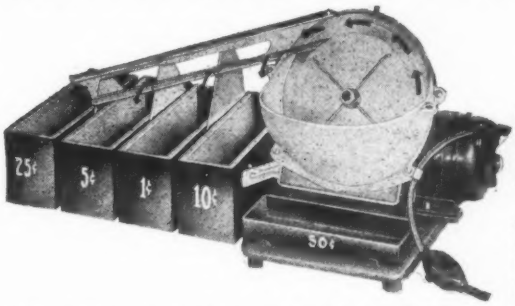
(Catalog on Request)

Circulars on Bank and Cashiering Supplies Sent on Request

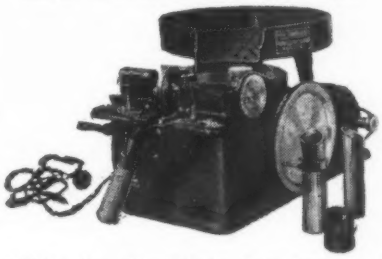


1—RAPID COIN ASSORTER

Speed—Coins Always Visible —Accuracy

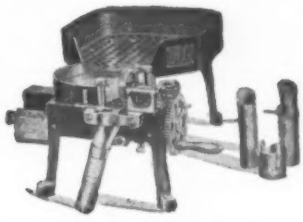
Simple in operation with no adjustments to make. The coins are put in the aluminum receptacle, the switch is turned on, the disc rotates and carries the coins up to the runway where quarters, nickels, pennies and dimes fall into four separate boxes on the left and half dollars fall into a box directly in front of the aluminum receptacle. Regularly equipped with 1/30th horsepower motor, 110 volts. Please state whether AC or DC current is used.

Model 4ET—(Electric) Coin Counter



MODEL No. 4ET—(Electric Coin Counter). A large motor driven machine with an unusual reputation for speed and durability. Will handle all coins. Automatically locks after each count of 20, 25, 30, 40 or 50 coins or will count indefinitely into a bag. Register can be reset to zero.

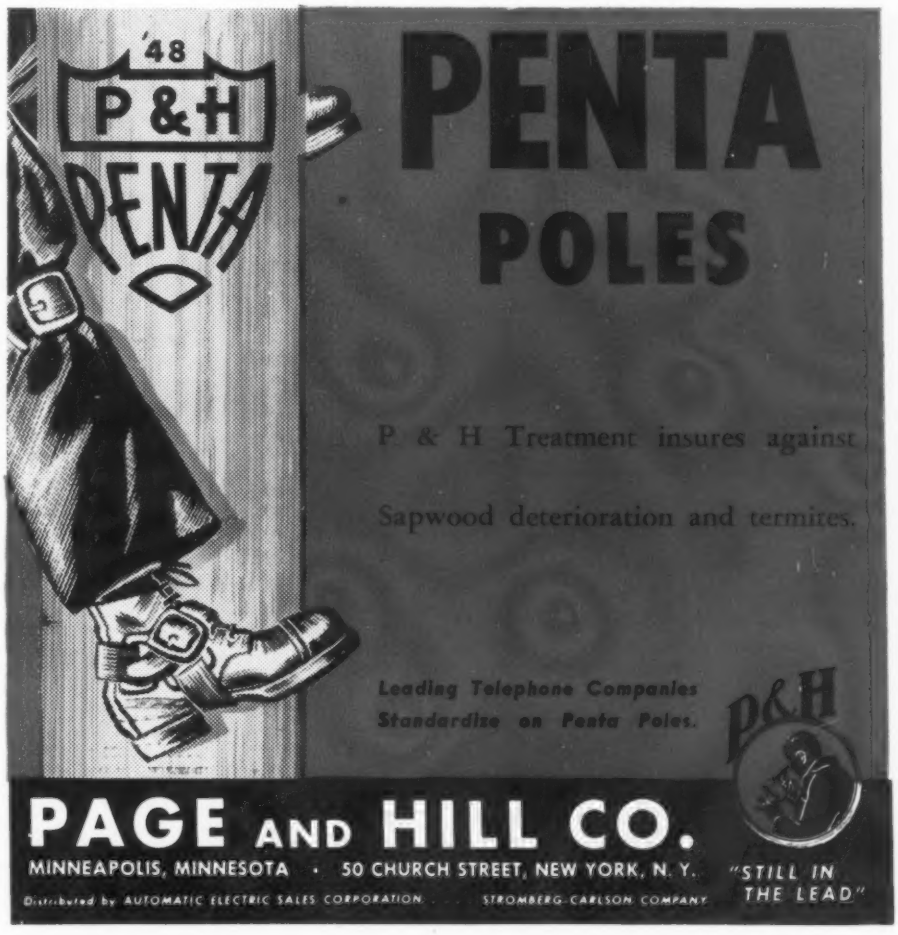
Model 2X—(Hand Operated) Coin Counter



MODEL No. 2X — (Hand Operated Coin Counter) Adjustable for pennies, nickels, dimes, quarters or halves. Can be set to lock automatically when 20, 25, 30, 40 or 50 coins have been counted or will count indefinitely into a bag. An operator can count and package 400 coins a minute or count 2000 coins into a bag. Register can be set to zero.

ABBOTT COIN COUNTER COMPANY

143rd Street and Wales Avenue • New York 54, N. Y.



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The field-sturdy Safe-T-Glow Detector contains a sensitive neon gas tube mounted on cushion supports. Current of 2,000 volts or over will cause the neon tube to glow. This glow, amplified by reflector mirrors, instantly and safely warns of "hot" wires.

Make the Safe-T-Glow recheck a part of your safety routine. Protect maintenance crews against dangerous high-voltage accidents. For circuits 2,000 to 220,000 volts, with 3 ft. or 9 ft. handle.

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STATEMENT OF OWNERSHIP

Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of TELEPHONY, published weekly at Chicago, Ill., for October 1, 1948.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared Ralph C. Reno, who, having been duly sworn according to law, deposes and says that he is the editor of TELEPHONY and the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August, 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Telephony Publishing Corp., 608 S. Dearborn St., Chicago 5, Ill.; editor, Ralph C. Reno, 608 S. Dearborn St., Chicago 5, Ill.; managing editor, Ralph C. Reno, 608 S. Dearborn St., Chicago 5, Ill., and business manager, H. D. Fargo, Jr., 608 S. Dearborn St., Chicago 5, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Telephony Publishing Corp., 608 S. Dearborn St., Chicago 5, Ill.; H. D. Fargo, 608 S. Dearborn St., Chicago 5, Ill.; H. D. Fargo, Jr., 608 S. Dearborn St., Chicago 5, Ill.; Ralph C. Reno, 608 S. Dearborn St., Chicago 5, Ill., and A. J. Stults, 608 S. Dearborn St., Chicago 5, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above is 7,688.

RALPH C. RENO.

Sworn to and subscribed before me this 2nd day of September, 1947.

ALBERT J. STULTS.

(My commission expires November 6, 1948.)

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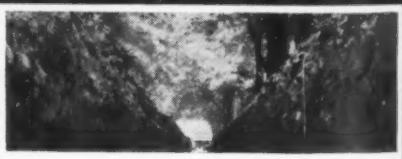

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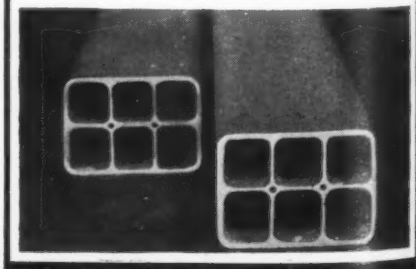

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